Trend Study 25B-3-04

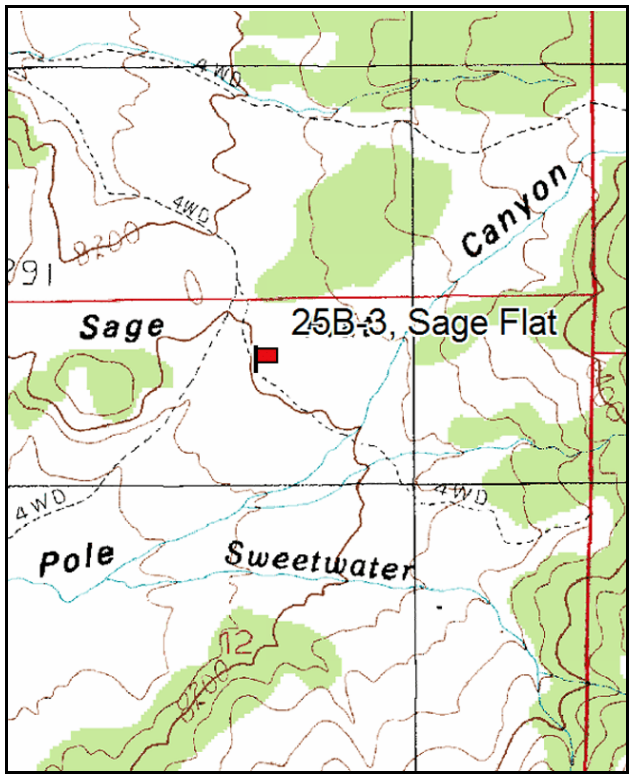
Study site name: Sage Flat . Vegetation type: Wyoming Big Sagebrush .

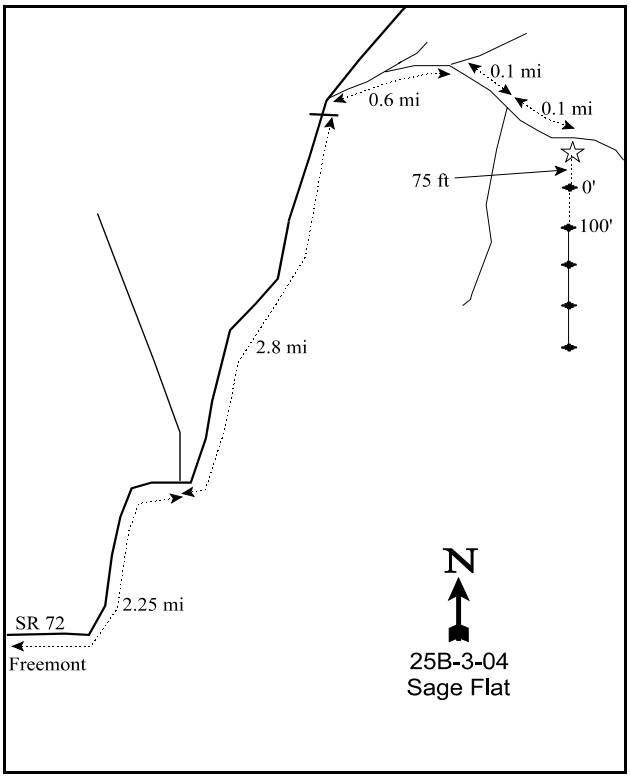
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11&95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Fremont travel north on SR 72 for 2.25 miles to a major fork, bear right and continue 2.8 miles on SR 72 to a cattleguard at the Forest Service boundary. One hundred yards beyond the cattleguard turn right. At 0.15 miles, a road forks off to the right. Go up this rough road 0.45 miles to a fork. Turn right and go 0.1 miles to another fork. Turn left at the fork and go 0.1 miles into the flat to a witness post on the right side of the road. The witness post and transect stakes are green steel fence posts with a white top. The frequency baseline, with browse tag #149, starts 75' due south of the witness post.





Map Name: Loa 1 NE, Utah

Diagrammatic Sketch

Township 27S , Range 3E , Section 12

GPS: NAD 27, UTM 12S 4259262 N, 453619 E

DISCUSSION

Sage Flat - Trend Study No. 25B-3

The Sage Flat trend study is located in an open valley dominated by Wyoming big sagebrush. The elevation is 8,200 feet with a southwest aspect and a slope of less than 5%. The area has been heavily grazed by livestock since the area was settled. The past abuses have led to an almost monotypic shrub type with few herbaceous plants. The area is considered a priority for a chaining and seeding treatment by the Forest Service and Division of Wildlife Resources. The flat is thought to be an important deer concentration area in winter and spring and would be enhanced by more early season herbaceous species. A deer pellet group transect in the flat monitored since 1981 shows an increase in deer use, up to a high of 19 deer days use/acre (47 ddu/ha) in 1984-85. It slowly decreased to 7 deer days use/acre (17 ddu/ha) in 1991-1992 (Jense et al. 1992). A pellet group transect read in conjunction with the vegetative transect in 1999 estimated 21 deer days use/acre (52 ddu/ha), 15 cow days use/acre (37 cdu/ha), and 6 elk days use/acre (15 edu/ha). Rabbit pellets were very high in 1999, which can have a detrimental effect on the herbaceous component because it is so limited on this site. The pellet group transect in 2004 estimated only 9 deer days use/acre (23ddu/ha) and 3 elk days use/acre (7 edu/ha).

Erosion is evident on the site. The soil surface is rough, composed of mounds of sandy soil. Plant pedestalling is abundant. A soil erosion condition class assessment rated erosion as moderate in 2004. Ground cover is provided only by the scattered sagebrush and underlying litter with only a few herbaceous plants. On average, about 50% of the soil surface is exposed and unprotected. The soil texture for the site is a loam, with a mildly alkaline pH (7.7). Effective rooting depth is moderate at more than 18 inches. Amounts of phosphorus (4.7ppm) and potassium (67.2ppm) in the soil could be limiting for plant growth and development. There are several small active gullies through the transect area. In 1994, small trees had been put into many of the small gullies to help them heal and help prevent further damage from high intensity summer storms.

Wyoming big sagebrush is the key species and accounts for most of the vegetation cover. From 1991 to 1999 sagebrush density was stable between 12,000-13,000 plants/acre. In 2004 density was 23% lower at 9,120 plants/acre. Cover has remained high with over 20% in each of the last three readings. Decadence has remained stable between 16-25% from 1991-2004. Percent dying increased in 2004 to 14% which was its highest. The amount of seedlings in the population was extremely high in 1985, but has been low ever since. The percentage of young plants in the population has been variable, but has always been at least 17%, which indicates good seedling survival and good recruitment. Utilization has been light to moderate with the highest amount of use seen in 1985 and 1999. Utilization was mostly light in 2004. Broom snakeweed density has been highly variable. It was highest in 1991 with nearly 10,000 plants/acre. It decreased to its lowest density in 1999 at 1,200 plants/acre and increased to 3,500 plants/acre in 2004. Cover of broom snakeweed was highest in 2004 at nearly 3%. Black sagebrush is uncommon in the valley with the deeper soils, but is dominant up the slope with shallow soils along with mature pinyon and juniper.

The herbaceous understory is sparse and has decreased since 1994. Western wheatgrass is the most abundant grass species, a desirable species for the site especially since it enhances water infiltration and also provides good forage. It was most abundant in 1994 with 2.4% cover. Since then it has decreased significantly. Bluebunch wheatgrass decreased significantly in 2004. The other grass species occur only occasionally, as do a few forbs. Total cover for the herbaceous understory is poor, as it does not usually amount to more than 3 to 4% total cover.

1985 APPARENT TREND ASSESSMENT

Soil trend appears down, as more top soil is lost and gullies become deeper. The unstable soil makes it difficult for grass and forb seedlings to become established. The presence of undesirable increaser shrubs, generally poor vigor of sagebrush, and low diversity and lack of herbaceous vegetation would indicate a downward vegetative trend. A chaining and seeding would be beneficial on the nearly flat areas of this valley. Also, further grazing restrictions may be necessary for recovery.

1991 TREND ASSESSMENT

Soil trend appears to be stable but very poor condition. Small pine tees have been set in the small gullies to help stabilize them. The key browse species have increased in density and decreased in percent decadency from 43% down to 24%. Wyoming big sagebrush now has a density of more than 12,000 plants per acre. The grasses have increased with the forbs also showing some change.

TREND ASSESSMENT
soil - stable, but very poor condition (3)
browse - up (5)
herbaceous understory - slightly up, but still poor condition (4)

1994 TREND ASSESSMENT

Soil is considered stable as there are only slight changes in cover values. However, at this time it is still in very poor condition with about 50% bare ground. There has been some effort to stabilize the small gullies that run through the sagebrush flat. The key shrub on this winter range is Wyoming big sagebrush. The percent young age class is quite high at 39%. Percent decadence has steadily gone down since 1985, from 43% to 24% and is now 16%. Broom snakeweed density has decreased by over 62% since 1985. Trend for browse is slightly up. The trend for the herbaceous understory is stable, for the grasses make up 94% of the herbaceous understory and they are almost the same nested frequency values as in 1991. The Desirable Components Index (see methods) rating is good at 51. The herbaceous understory is lacking, but the sagebrush is abundant and healthy.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - stable (3) stable for grasses, the forbs went down, but they only make up a very small portion of the herbaceous cover, total cover is still barely 4%
winter range condition (DC Index) - 51 (good) Wyoming big sagebrush type

1999 TREND ASSESSMENT

Soil trend is stable and still in very poor condition with relative bare ground cover at 45%. There has been some effort to stabilize the small gullies that run through the sagebrush flat but the gully plugs are not stopping continued gully erosion. The key shrub on this winter range is Wyoming big sagebrush. The percent young age class is quite high at 43%. Percent decadence had steadily gone down since 1985, from 43% to 24% and then 16%. However, it has now gone up again to 24%. This is still not alarming because of the relatively high density. Broom snakeweed density have a decreased density again. It cannot compete with the much more competitive sagebrush at these high densities and with drought. Trend for browse is stable. The trend for the herbaceous understory is stable, for the grasses make up 94% of the herbaceous understory and they are almost the same nested frequency values as in 1991.

TREND ASSESSMENT
soil - stable, but still very poor (3)
browse - stable (3)
herbaceous understory - stable, but still poor with 4% total cover (3)
winter range condition (DC Index) - 60 (good) Wyoming big sagebrush type

2004 TREND ASSESSMENT

The soil trend is stable, but still in very poor condition with active erosion on site. The browse trend is stable. Wyoming big sagebrush is the key species and is very abundant with over 22% cover and a very high density. Density did decline 23% since 1999, but decadence remained stable. The percent of plants dying did increase to 14% from 8% in 1999, but the percent of young plants is high (20%) and is adequate for replacing dying plants. Reproduction is good on this site, especially with the poor reproductive conditions seen for other Wyoming big sagebrush stands around the state. The absence of winter annuals competing for the limited resources allows sagebrush to reproduce without problems at this location. Broom snakeweed density and cover is higher than it was in 1999. The herbaceous understory trend is slightly down. Frequency of perennial grasses and perennial forbs declined to its lowest since this site was established. The herbaceous understory makes up less than 3% total cover.

soil - stable, but still very poor (3)
browse - stable (3)
herbaceous understory - slightly down (2)
winter range condition (DC Index) - 53 (good) Wyoming big sagebrush type

HERBACEOUS TRENDS --
Management unit 25B, Study no: 3

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'94	'99	'04	'94	'99	'04
G	Agropyron smithii	a137	b182	b196	a133	a133	2.41	1.15	.72
G	Agropyron spicatum	a-	a-	a-	b62	a3	-	.50	.06
G	Bouteloua gracilis	a-	b10	b17	b16	b15	.25	.36	.74
G	Oryzopsis hymenoides	a5	ab9	a6	b22	b29	.21	.29	.51
G	Poa secunda	5	-	-	-	-	-	-	-
G	Sitanion hystrix	b94	ab74	a57	a42	a41	1.14	.66	.69
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		241	275	276	275	221	4.03	2.98	2.73
Total for Grasses		241	275	276	275	221	4.03	2.98	2.73
F	Arabis spp.	-	-	-	2	3	-	.01	.03
F	Cryptantha spp.	b11	c30	bc13	a-	b5	.09	-	.02
F	Cymopterus spp.	-	2	-	-	-	-	-	-
F	Erigeron pumilus	32	45	22	40	19	.12	.15	.13
F	Hymenoxys richardsonii	4	1	-	2	-	.00	.15	-
F	Penstemon spp.	-	-	-	1	-	.00	.00	-
F	Phlox longifolia	b38	c64	a6	a13	a5	.01	.04	.01

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'94	'99	'04	'94	'99	'04
F	Senecio multilobatus	-	1	-	-	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		86	143	41	58	32	0.23	0.35	0.18
Total for Forbs		86	143	41	58	32	0.23	0.35	0.18

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25B, Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Artemisia frigida	7	13	6	.15	.30	.15
B	Artemisia nova	0	3	2	-	.63	.63
B	Artemisia tridentata wyomingensis	99	98	99	21.47	20.11	22.17
B	Ceratoides lanata	1	0	0	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	9	11	12	.01	.00	.03
B	Coryphantha vivipara arizonica	0	3	0	-	-	-
B	Eriogonum microthecum	0	0	1	-	-	-
B	Gutierrezia sarothrae	64	36	64	.69	.33	2.59
Total for Browse		180	164	184	22.33	21.37	25.57

CANOPY COVER, LINE INTERCEPT --
Management unit 25B, Study no: 3

Species	Percent Cover '04
Artemisia nova	.08
Artemisia tridentata wyomingensis	23.20
Gutierrezia sarothrae	1.79

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25B, Study no: 3

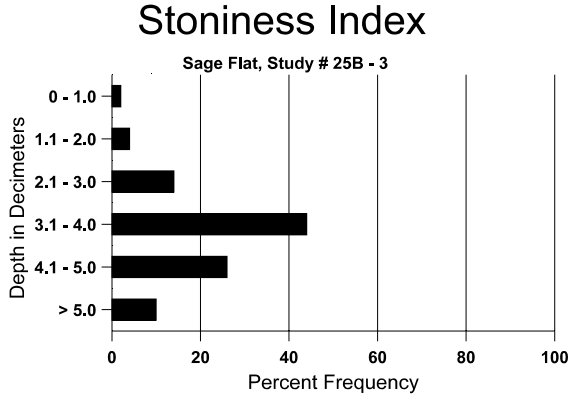
Species	Average leader growth (in) '04
Artemisia tridentata wyomingensis	1.5

BASIC COVER --
Management unit 25B, Study no: 3

Cover Type	Average Cover % '85	'91	'94	'99	'04
Vegetation	6.00	2.50	24.93	24.49	26.55
Rock	.50	.50	1.67	.54	2.04
Pavement	2.50	4.00	.98	4.90	4.84
Litter	30.00	27.00	18.25	19.50	19.04
Cryptogams	5.00	10.50	7.34	7.58	10.43
Bare Ground	56.00	55.50	50.48	46.57	46.81

SOIL ANALYSIS DATA --
Management unit 25B, Study no: 3, Study Name: Sage Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
18.3	49.0 (16.4)	7.7	42.6	31.8	25.6	1.9	4.7	67.2	0.7



PELLET GROUP DATA --
Management unit 25B, Study no: 3

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	25	53	11
Elk	4	3	3
Deer	1	2	2
Cattle	4	2	1

Days use per acre (ha)	
'99	'04
-	-
6 (15)	3 (7)
21 (52)	9 (23)
15 (37)	-

BROWSE CHARACTERISTICS --
Management unit 25B, Study no: 3

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia frigida												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**132**	-	66	66	-	-	0	50	0	-	0	5/7
94	**320**	-	-	320	-	-	0	0	0	-	0	3/5
99	**500**	20	120	340	40	-	44	32	8	-	0	3/5
04	**220**	-	-	220	-	-	27	0	0	-	0	3/4
Artemisia nova												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**140**	-	80	40	20	-	57	0	14	-	0	6/10
04	**140**	-	-	100	40	-	0	0	29	14	14	9/16
Artemisia tridentata wyomingensis												
85	**7399**	9200	1266	2933	3200	-	47	33	43	.27	4	19/20
91	**12665**	933	6333	3266	3066	-	16	11	24	.94	5	20/26
94	**12960**	40	5060	5840	2060	1000	.46	0	16	7	8	19/29
99	**11920**	280	5160	3940	2820	1580	54	10	24	8	8	18/27
04	**9120**	20	1860	5020	2240	1680	29	9	25	14	14	15/23
Ceratoides lanata												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**20**	-	20	-	-	-	0	0	-	-	0	2/2
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus stenophyllus												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**240**	-	20	140	80	-	0	0	33	-	0	4/6
99	**280**	-	60	40	180	200	0	29	64	43	43	4/6
04	**360**	-	120	220	20	-	17	0	6	6	6	4/5
Coryphantha vivipara arizonica												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**60**	-	60	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Eriogonum microthecum												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**40**	-	-	20	20	-	0	100	50	50	50	7/2
Gutierrezia sarothrae												
85	**8999**	2066	1600	6133	1266	-	1	.74	14	-	.74	7/5
91	**9932**	133	4333	5133	466	-	7	.67	5	.60	3	3/2
94	**3760**	60	260	3180	320	180	0	0	9	-	.53	5/5
99	**1200**	840	560	600	40	80	0	0	3	2	2	6/6
04	**3500**	-	-	3500	-	-	0	0	0	-	0	6/8
Opuntia spp.												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	3/9
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-